


INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference LU6141	FOR FURTHER ACTION See Form PCT/IPEA416	
International application No. PCT/EP2004/012108	International filing date (day/month/year) 27.10.2004	Priority date (day/month/year) 31.10.2003
International Patent Classification (IPC) or national classification and IPC C08F10/02		
Applicant BASELL POLYOLEFINE GMBH et al		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in Item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 19.04.2005	Date of completion of this report 20.02.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Droghetti, A Telephone No. +31 70 340-4143	



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ON PATENTABILITY**

International application No.
PCT/EP2004/012108

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-10 as originally filed

Claims, Numbers

1-9 as originally filed

Drawings, Sheets

1 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing *(specify)*:
 - ☐ any table(s) related to sequence listing *(specify)*:
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing *(specify)*:
 - ☐ any table(s) related to sequence listing *(specify)*:

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-9
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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Re Item V

Reference is made to the following documents:

D1: US B 6562915

D2: EP A 0567818 (cited by the applicant)

D3: GB A 823932

1. Novelty (Art. 33(2) PCT)

The subject-matter of claims 1-9 is novel in view of D1-D3. The reasons as follows.

None of documents D1-D3 discloses the same process for high-pressure ethylene polymerisation, wherein a isoparaffin solvent for the radical initiator has been recycled and purified as claimed (search report).

Thus the subject-matter of claims 1-9 is novel in view of D1, D2 and D3.

2. Inventive Step (Art. 33(3) PCT)

The subject-matter of claims 1-9 cannot be regarded as inventive for the following reasons.

2.1. D1, which is regarded as the closest prior art, relates to a process for the high-pressure ethylene polymerisation in a continuously operating apparatus comprising a high-pressure circuit and a low-pressure circuit for the separation of polymers from the other liquid or gas polymerisation components as claimed (search report). No reference in D1 is done with regard to the solvents employed in the process.

The present application differs from D1 in that in the low-pressure circuit a isoparaffin solvent having boiling point as claimed is separated and recycled.

According to the examples on file (pages 9-10) the use of a paraffin solvent as claimed facilitates the purification and separation process of the solvent itself in the circuit, with regard to the more common hydrocarbon solvents used in the field (e.g. isododecane).

The problem to be solved by the present invention may therefore be regarded as the provision of a process for the high-pressure ethylene polymerisation presenting improved purification and recycling of the solvents.

The solution proposed in claim 1-9 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

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The use of a low-pressure circuit having separators and condenser, wherein the side products deriving from ethylene polymerisation in a high-pressure multi-zone reactor are separated, is well-known in the art (in D1 and D2).

In D2 for example some condenser and separators in serie work to separate the liquid and gas side products from the polyethylene as claimed (see search report).

Furthermore the use of paraffin solvents having low boiling point as claimed in order to be purified and recycled in an easy and economical way in ethylene high-pressure polymerisation process is also well-known in the prio art.

In D3 for example the paraffin solvents having low boiling points as claimed can be easily separated and recycled in reduced pressure circuits. The use of low boiling solvents does not affect the yield of the polymerisation reaction (search report).

Thus the subject-matter of claims 1-6,8 cannot be regarded as inventive in view of D1-D3.

2.2. Dependent claims 7 and 9 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons being as follows

The subject-matter of claim 7 consists in the selection of a determined range of low boiling points solvents over the low-boiling points solvents described in D3.

Such a selection can only be regarded as inventive, if the claimed range of boiling points for the solvents presents unexpected effects or properties in relation to the paraffin solvents in D3. However, no such effects or properties are indicated in the application. Hence, no inventive step is present in the subject-matter of claim 7.

Furthermore the use of a collection-stock vessel for the recycled solvents as claimed in claim 9 appears as a slight constructional change with regard to the plant disclosed in D1 or D2, which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of claim 9 also lacks an inventive step.

2.3. In the light of the considerations above the subject-matter of claims 1-9 is not regarded as inventive.

3. The subject-matter of claims 1-9 meets the requirements of **Article 33(4) PCT**, with regard to **industrial applicability**.

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Re Item VII

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D3 is not mentioned in the description, nor are these documents identified therein.

Re Item VIII (Art. 6 PCT)

1. The wording "preferably" referring to an essential technical feature does not limit the claims, thus rendering the same unclear.

Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)
The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

**Declaration of inventorship (Rules 4.17(iv) and 51bis.1(a)(iv))
 for the purposes of the designation of the United States of America:**

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/..... (if furnishing declaration pursuant to Rule 26ter).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America, having a filing date before that of the application on which foreign priority is claimed.

Prior Applications: DE 10351262.4 filed on October 31, 2003
 US 60/525268 filed on November 25, 2003

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Citizenship: Russian

Inventor's Signature: Andrei Gonioukh Date: July 19, 2004
 (if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent) (of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

Name: Gernot Köhler

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Inventor's Signature: Gernot Köhler Date: July 19, 2004
 (if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent) (of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

☒ This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

Sheet No. 5

Continuation of Box No. VIII (i) to (v) DECLARATION

If the space is insufficient in any of Boxes Nos. VIII (i) to (v) to furnish all the information, including in the case where more than two inventors are to be named in Box No. VIII (iv), in such case, write "Continuation of Box No. VIII ..." (indicate the item number of the Box) and furnish the information in the same manner as required for the purposes of the Box in which the space was insufficient. If additional space is needed in respect of two or more declarations, a separate continuation box must be used for each such declaration. If this Box is not used, this sheet should not be included in the request.

Name: Theo Teubner

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Inventor's Signature: Thomas Dröge Date: July 5, 2004

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(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

Name:

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Mailing Address:

Citizenship:

Inventor's Signature: _____ Date:

(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent)

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

Name:

Residence:

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Mailing Address:

Citizenship:

Inventor's Signature: _____ Date:

(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent)

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)